

## FURTHER DEFINITION OF *CONYZA* (ASTERACEAE: ASTEREAEE)

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### ABSTRACT

After the removal of *Laennecia*, New World *Conyza* is monophyletic, and a more meaningful and precise definition of the genus can be formulated. Among genera of New World Astereae, *Conyza* is more similar to *Erigeron* and *Trimorpha* in its phyllaries with orange resinous midveins and deltate disc corolla lobes, and more similar to *Trimorpha* than *Erigeron* in its 3 nerved phyllaries, broad zone of numerous pistillate flowers and pappus that elongates at maturity past the corollas. *Conyza* in the Old World appears to be polyphyletic.

KEY WORDS: *Conyza*, *Erigeron*, *Nidorella*, *Laennecia*, Astereae, Asteraceae.

The distinction between *Conyza* and *Erigeron* has long been problematic, but the problem has been accentuated by a lack of an understanding of the generic boundaries of *Conyza*. Zardini's definition of *Conyza* (1976) was largely a restatement of the traditional criteria used by Lessing (1832), DeCandolle (1836), Bentham (1873), Bentham & Hooker (1873) and Hoffmann (1890), and slightly broadened by Cronquist (1947). Cronquist correctly included in *Conyza* the ligulate species of *Erigeron* sect. *Caenotus*, but other ligulate species transferred to *Conyza* by him have now been included in *Laennecia* (Zardini 1981; Nesom 1990). With the removal of the superficially similar *Laennecia* (Nesom 1990), *Conyza* can be more precisely circumscribed.

In the traditional view, the pistillate flowers of *Conyza* have ligules absent or highly reduced, while the ligules in *Erigeron* are broad and prominent, usually extending well past the involucre. There are, however, other constant points of difference between these two genera, particularly in phyllary morphology, the relative composition of pistillate and hermaphroditic flowers, and length of the mature pappus bristles. As summarized in the key below, *Conyza* is more similar in features of pappus and floral morphology to *Trimorpha* (Nesom 1989b) than to *Erigeron*, although it is not clear whether the similarities represent homologies or features derived in parallel.

1. Phyllaries mostly 1 nerved; pistillate flowers in 1(-2-3) series, many fewer than the hermaphroditic ones; pappus bristles not elongating at maturity, not extending past the involucre ..... *Erigeron*
- 1' Phyllaries mostly 3 nerved; pistillate flowers usually in numerous series in a broad zone, more numerous than the hermaphroditic ones; pappus bristles at maturity elongating past the involucre ..... (2)
  2. Pistillate flowers dimorphic and in 2 zones, eligulate in the inner zone, ligulate in the outer zone with the ligules extending past the involucre ..... *Trimorpha*
  - 2' Pistillate flowers monomorphic, the ligules absent or present but never more than barely exceeding the involucre in length . *Conyza*

As noted earlier (Nesom 1989a), a few species of *Erigeron* have 3 nerved phyllaries. They occur in each of the three species of *E. sect. Spinosi* and occasional species of the large *E. sect. Fruticosus*, as well as a few species of sect. *Wyomingia*. Because of the ubiquitous occurrence in both *Conyza* and *Trimorpha* of 3 nerved phyllaries, I believe this is a primitive feature in *Erigeron*. Some insular species of *Erigeron* have a greatly reduced number of disc flowers, so that the relative composition of ray and disc flowers is atypical and more like that of *Conyza*. Other species of *Erigeron*, particularly in sect. *Cincinnatiensis* produce extraordinarily large numbers of ray flowers with filiform ligules, which also shifts the ray/disc ratio. These exceptions do not alter significantly the associated groups of characters that distinguish *Conyza* from *Erigeron*.

This definition of *Conyza* holds for species of the New World, including the type, which appear to be monophyletic after the removal of *Laennecia*. In the Old World, however, the group of species currently identified as *Conyza* is more variably complex and includes species with 1 nerved phyllaries, yellow rays, glandular achenes and corollas, and other features that strongly suggest that a polyphyletic group is involved. The distinction between *Nidorella* and *Conyza* has been addressed by Wild (1969a; 1969b; 1975). In my opinion, however, this taxonomy is far from resolved and at least *Conyza* as now constituted in the Old World appears to be strongly heterogeneous, including species that probably belong with the species of *Nidorella*. Wild's overemphasis of the morphology of the ray florets, the relative degree of inclusion of the ray stigmas and the relative length of the mature pappus have contributed to the formation of an artificial classification.

*Conyza welwitschii* (S. Moore) Wild, *C. pyrrhopappa* Schultz-Bip. ex A. Rich., *C. waefolia* (L.) Less. and *C. stricta* Willd. all have glandular corollas and achenes. The first two have yellow ligules and *C. waefolia* has basally united pappus bristles. None of these can be accommodated in *Conyza* without

severely disrupting the natural boundaries of the genus. *Conyza aegyptica* (L.) Ait., *C. pinnata* (L. f.) Kuntze and *C. podocephala* DC. have eglandular achenes but their 1 nerved phyllaries set them apart from *Conyza sensu stricto*. Still others, such as *C. limosa* O. Hoffm., with disc flowers with sterile ovaries, and *C. tigrensis* Oliv. & Hiern. and *C. subscaposa* O. Hoffm., with unusually large achenes, should also be suspected of representing clades divergent from *Conyza*. These examples of atypical variation among Old World species are representative but by no means complete.

The following generic description and list of representative species (both drawn from the New World) are provided as a step toward clarifying the definition of *Conyza*. The generic synonyms include New World and Old World taxa, and all are typified by species currently accepted at least by Old World systematists as *Conyza*. *Eschenbachia*, the oldest name representing Old World taxa, and *Dimorphanthes* have been formally rejected vs *Conyza* as generic names, but along with *Edemias*, *Marsea* and *Fimbrillaria*, they represent phylogenetically discordant elements within *Conyza* that probably will need to be segregated.

*Conyza* Less., *Syn. Gen. Comp.* 203. 1832, *nom. conserv.*, non Linnaeus. Type species: *Conyza chilensis* Sprengel, *typus conserv.* ( $\equiv$  *Conyza primulaefolia* [Lamarck] Lourteig & Cuatr., according to Lourteig & Cuatrecasas 1985). *Erigeron* sect. *Conyza* (Less.) Baillon, *Hist. Pl.* 8:143. 1882.

*Erigeron* sect. *Caenotus* Nutt., *Gen. Plant.* 2:148. 1818. Type species: *Erigeron canadensis* L. ( $\equiv$  *Conyza canadensis* [L.] Cronq.). *Conyza* sect. *Caenotus* (Nutt.) Cronq. *ex Cuatr.*, *Webbia* 24:211. 1969. The valid transfer of sect. *Caenotus* from *Erigeron* to *Conyza*, which has been attributed to Cronquist (Bull. Torrey Bot. Club 70:631. 1943), apparently was not made until Cuatrecasas' treatment of the Astereae of Colombia (1969).

*Conyzella* Fabric., *Enum.* (ed. 1) 86. 1759. Type species: *Erigeron canadensis* L. ( $\equiv$  *Conyza canadensis* [L.] Cronq.).

*Leptilon* Rafin., *Amer. Monthly Mag.* 268. 1818. Type species: *Leptilon divaricatum* (Michx.) Rafin. ( $\equiv$  *Erigeron divaricatum* Michx.;  $\equiv$  *Conyza ramosissima* Cronq.).

*Eschenbachia* Moench, *Method. Pl.* 573. 1794. Type species: *Eschenbachia globosa* Moench, *nom. illeg.* ( $\equiv$  *Conyza aegyptica* [L.] Ait.)

*Dimorphanthes* Cass., *Bull. Sci. Soc. Philom. Paris* 1818:30. 1818. Lectotype species (designated here): *Conyza* (*Erigeron*) *aegyptica* (L.) Ait. Cassini also cited *Erigeron sculum*, *E. gouanii* and *E. chinense*.

*Edemias* Rafin., *Fl. Tell.* 2:49. 1837. Lectotype species (designated here): *Conyza aegyptica* (L.) Ait. Rafinesque also cited "*Conyza gouani* L." ( $\equiv$  *C. gouani* [L.] Willd.).

*Marsea* Adanson, *Fam.* 2:122. 1763. Type species: *Baccharis ivaefolia* L. ( $\equiv$  *Conyza ivaefolia* [L.] Less.)

*Fimbrillaria* Cass., *Bull. Sci. Soc. Philom. Paris* 31. 1818. Type species: *Baccharis ivaefolia* L. ( $\equiv$  *Conyza ivaefolia* [L.] Less.)

Annual or perennial herbs, nearly glabrous to coarsely hispid-pilose, sometimes stipitate glandular. Leaves alternate, entire to toothed or pinnately lobed. Heads campanulate-urceolate, in a terminal corymb or dense, ovoid panicle; phyllaries sometimes fused into a hypanthium like cup or ring and appearing inserted on it, the outer usually with 3, prominent, orange resinous nerves on the abaxial surface, the nerves apparently reduced to one in species with very small heads (e.g., *Conyza canadensis*). Pistillate flowers fertile, numerous in 1-4 series, the corollas whitish or bluish, tubular-filiform, usually shorter than the stigma, eligulate with a fimbriate apex or the ligules very short and not or barely exceeding the length of the involucre. Disc flowers relatively many fewer than the pistillate ones, perfect, fertile, the corollas light yellow, narrowly tubular-funnelform, with deltate lobes, eglandular; style branches with collecting appendages mostly deltate. Achenes biconvex with 2, thin, lateral nerves, glabrous to sparsely strigose with twin hairs (Zwilling-shaare), eglandular; pappus uniseriate, of barbellate bristles that lengthen to exceed the ray and disc corollas and involucre at maturity. Base chromosome number,  $x=9$ .

Representative New World species of *Conyza* sensu stricto examined.

*Conyza apurensis* Kunth, *C. blakei* (Cabrera) Cabrera, *C. bonariensis* (L.) Cronq., *C. canadensis* (L.) Cronq., *C. catharinensis* Cabrera, *C. coronopifolia* Kunth, *C. floribunda* (Kunth) Schultz-Bip., *C. microcephala* Hemsley, *C. notobellidiastrum* Griseb., *C. pampeana* (Parodi) Cabrera, *C. primulaefolia* (Lam.) Lourteig & Cuatr., *C. ramosissima* Cronq., *C. rivularis* Gardn., *C. saltensis* Cabrera, *C. sordescens* Cabrera, *C. trihecatactis* (S.F. Blake) Cuatr., *C. uliginosa* (Benth.) Cuatr. and *C. burkartii* Zardini.

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## LITERATURE CITED

- Bentham, G. 1873. Notes on the classification, history, and geographic distribution of Compositae. *J. Linn. Soc. Bot.* 13:335-577.
- & J.D. Hooker. 1873. Compositae. *Genera Plantarum* 2(1):163-533.
- Cronquist, A. 1943. The separation of *Erigeron* from *Conyza*. *Bull. Torrey Bot. Club* 70:629-632.
- Cuatrecasas, J. 1969. *Prima Flora Colombiana*. 3. Compositae-Astereae. *Webbia* 24:1-335.
- DeCandolle, A.P. 1836. *Conyza*. *Prodr.* 5:377-396.
- Hoffmann, O. 1890. Tubiflorae-Astereae. In Engler, A. & K. Prantl, *Die Natürlichen Pflanzenfamilien* 4(5):87-394.
- Lessing, C.F. 1832. *Synopsis generum Compositarum*. Berlin.
- Lourteig, A. & J. Cuatrecasas. 1985. Nomenclatura plantarum americanarum. III. Compositae. *Phytologia* 58:475-476.
- Nesom, G.L. 1989a. Infrageneric taxonomy of New World *Erigeron* (Compositae: Astereae). *Phytologia* 67:67-93.
- . 1989b. The separation of *Trimorpha* (Compositae: Astereae) from *Erigeron*. *Phytologia* 67:61-66.
- . 1990. Taxonomy of *Laennecia* (Asteraceae: Astereae). *Phytologia* 68:205-228.
- Wild, H. 1969a. The species of *Conyza* L. with ligulate or lobed ray florets in Africa, Madagascar and the Cape Verde Islands. *Bol. Soc. Broter.* 43:247-276.
- . 1969b. The genus *Nidorella* Cass. *Bol. Soc. Broter.* 43:209-241.
- . 1975. The Compositae of the Flora Zambesiaca Area, 4 - Astereae. *Kirkia* 10:1-72.
- Zardini, E.M. 1976. Contribuciones para una monografía del género *Conyza* Less. I. *Darwiniana* 17:31-46.
- . 1981. Contribuciones para una monografía del género *Conyza* Less. II. Rehabilitación del género *Laennecia* Cass. *Darwiniana* 23:159-169.